TRYING TO KEEP "MAD COW DISEASE" OUT OF U.S. HERDS

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Millions of British television viewers watched the harrowing final days of 14-year-old Zoe Jeffries in October 2000. The ordeal of the young girl from Manchester, England, began more than two years earlier. First she cried forn two weeks, then came the hallucinations and continuous screaming. As the disease progressed, the pain in her legs worsened until she couldn't walk. Bedridden, her brain wasting away, she was reduced to communicating through moans and grunts. Zoe's mother, Helen Jeffries, let the television cameras into her home to demonstrate the plight of people like her daughter--victims of new variant Creutzfeldt-Jakob disease, or nvCJD. The neurological illness is thought to be the human form of bovine spongiform encephalopathy, or BSE-commonly called "Mad Cow Disease." The disease is thus far untreatable, incurable, and ultimately fatal. "It's a bad disease," says Lawrence Schonberger, MD, MPH, an epidemiologist at the Centers for Disease Control and Prevention (CDC). "We believe that it is transmitted by food that has been contaminated with the agent that causes BSE. Every case of nvCJD is a major tragedy." Although the incubation period after initial exposure can be quite long, once clinical signs and symptoms begin, death usually occurs within about a year. The recent increase in reported cases of BSE in European cows and the increasing number of human nvCJD cases in the United Kingdom have raised fears throughout the European Union (EU) of the risk of eating beef possibly contaminated with the BSE agent. Although these concerns may have spread to the United States, the diseases have not. No cases of nvCJD in humans or BSE in cows have ever been identified in this country.[HOWEVER, THERE ARE SEVERAL CASES EACH YEAR IN AMERICA OF CJD (CREUZFELD-JACOB DISEASE) AND HAVE BEEN FOR MANY YEARS. BUT THIS IS NOT RELATED TO EATING BEEF...SO FAR. IT MAY HAPPEN SPONTANEOUSLY, OR BE INHERITED.]

BSE and nvCJD have thus far been kept out of the United States largely through the combined efforts of the Food and Drug Administration, the U.S. Department of Agriculture (USDA), the CDC, other federal organizations, and state regulatory and health agencies. These organizations have taken aggressive actions to reduce the risk that BSE could be introduced and spread in this country.

BSE has infected more than 180,000 cattle in the UK and about 1,800 cattle elsewhere in the EU, according to the European Commission's Health and Consumer Protection Directorate, an agency of the EU. Because of UK actions to eradicate BSE since it was first identified in 1986, the number of BSE cases is falling sharply in that country, but it is rising in a number of other European countries.

The sudden rise in reported BSE cases may, in part, reflect increased testing to detect infected cattle by some EU member countries, particularly France, according to Burt Pritchett, a veterinarian in FDA's Center for Veterinary Medicine. "And because of the long incubation period of BSE (two to eight years), cows being identified with BSE now would have become infected several years ago," says Pritchett. "In December 2000, the EU imposed BSE testing EU-wide, which will likely further increase the number of cases being reported." How BSE Spreads Within Cattle Herds Evidence suggests that certain contaminated cattle feed ingredients are the source of BSE infection in cattle. The process that leads to the contaminated feed starts when livestock already harboring the BSE agent are slaughtered. After cows and sheep are killed, the edible parts are removed. The inedible remnants are taken to a special plant, where they undergo a process called "rendering." This process creates two major products: fat, which is used in an amazing array of products (such as soap, lipstick, linoleum, and glue), and meat-and-bone meal (MBM), a powdery, high-protein supplement that is often processed into animal feed. Although the animal remnants are "cooked" at high temperatures during therendering process, the BSE agent, if present, is able to survive. When this contaminated MBM is fed to cattle as a protein supplement, the BSE agent can be passed on to many new cattle. It is believed that this is how BSE was spread through the UK cattle herds. In 1997, scientists at the Institute for Animal Health in Edinburgh, Scotland, and the Imperial College School of Medicine in London presented studies that strongly pointed to the agent that causes BSE as the most likely cause of human nvCJD. The UK government concluded that victims of nvCJD most likely acquired the disease by consuming food that had been made from cattle infected with BSE. Although BSE and nvCJD occur in different species, they both belong to a family of fatal neurological diseases known as transmissible spongiform encephalopathies (TSEs), so named because of the sponge-like holes they leave in the brain. Currently, no test can reliably detect BSE in live cattle or nvCJD in live humans. Adiagnosis is confirmed by examining brain tissue after death. The agent that causes TSEs is not well understood. The prevailing theory of the

scientific community is that the agent is a "prion," an abnormal, slowly replicating protein.

"So little is known about prion diseases," says James Voss, DVM, of the College of Veterinary Medicine and Biomedical Sciences at Colorado State University. "It's a very difficult area to study because of the long incubation period of these diseases," says Voss, who is also the co-chairman of the TSE Task Force of the Council for Agricultural Science and Technology, a nonprofit research consortium. "We believe the risk is very, very low that BSE could gain entry to this country, but no one can say with 100 percent certainty that it won't happen." "We know that our cattle are not immune to this disease just because they live on this side of the Atlantic Ocean," says Murray Lumpkin, senior medical advisor in FDA's Office of the Commissioner. "Renderers, cattle ranchers, feed manufacturers, feed lot operators, and state and federal government agencies will all have to continue to work together vigilantly to assure safe cattle-feeding practices are scrupulously followed. This is our first line of defense against the disease getting into American cattle herds." Other TSEs are known to occur in sheep, mink, deer, elk, and cats. The recent European outbreak of BSE may have originally resulted from feeding cattle with MBM-supplemented feed made from sheep carcasses infected with scrapie--a TSE found in sheep and goats.
Unlike BSE, other animal TSEs do not appear to be naturally transmitted to humans, according to an October 2000 report of the TSE Task Force. However, five TSEs do occur in humans--all of them rare. In 1957, scientists first recorded a human TSE, called kuru, in the Fore natives of the New Guinea highlands. The Fores were cannibals--they ate parts of their fellow humans, especially brain tissue. It is believed this practice contributed to further spread of kuru in the population. Two Forms of CJD Another human TSE, Creutzfeldt-Jakob disease, in its classic form, occurs worldwide at a rate of approximately one case per 1 million people per year.
Classic CJD, unlike its new variant, nvCJD, is not known to be caused by consuming food made from cows infected with BSE.
"CJD and nvCJD are best thought of as two different diseases," says CDC's Schonberger. "CJD was around long before the emergence of BSE in cattle." Victims of classic CJD and nvCJD may share some symptoms, but the patterns of the brain lesions are distinct. To date, nvCJD has caused disease in younger patients, and the mean duration of illness is more prolonged. (The average age for death of nvCJD has been 27.5 versus 68 for CJD, and the average time to death after the onset of clinical symptoms is 13 months for nvCJD versus less than six months for CJD.) As of Feb. 2, 2001, a total of 94 cases of nvCJD

have been confirmed or suspected in the UK, according to the UK Department of Health. Three cases in France and one in Ireland were reported by the European Commission's Health and Consumer Protection Directorate. The U.S. Response. The focus for American animal and human health officials has been prevention. "Using the best science known at this time, the United States has an aggressive, multi-faceted program in place to try to prevent the establishment and spread of BSE," says Stephen Sundlof, DVM, PhD, director of FDA's Center for Veterinary Medicine. FDA's restrictions on certain cattle feed ingredients and its import alerts on cattle products are critical parts of this program. In addition, USDA has prohibited certain animals and animal products from entering the country. Since 1989, USDA's Animal and Plant Health Inspection Service (APHIS) has banned the import of live ruminants (cattle, sheep, and goats) and most ruminant products from countries where BSE has been reported. In addition, in 1990, APHIS began a program of active surveillance of certain American cows for evidence of BSE. While FDA inspects feed production facilities, the USDA surveillance program condemns and tests any cows displaying signs of neurological problems at slaughter. As of October 2000, approximately 12,000 cattle brains from nearly every state and Puerto Rico had been examined, with no evidence of BSE found. More than 60 diagnostic laboratories continue to examine hundreds of cattle brains each year. In August 1997, FDA established a regulation that prohibits the use of most mammalian protein in the manufacture of animal feeds for ruminants. With the strong support of renderers, cattle owners, feed manufacturers, and feed lot owners, FDA launched a compliance and education program, including a rigorous inspection program. The goal of these efforts is to achieve as close to 100 percent compliance with this new regulation as possible. FDA and state regulators have conducted nearly 10,000 inspections of renderers, feed mills, ruminant feeders, dairy farms, protein blenders, feed haulers, and distributors since January 1998. More than three-quarters of these establishments were found to be in compliance. And most of the establishments that initially had problems were found in compliance upon re-inspection. Education is also an extremely important part of the compliance program. "We've put a lot ofeffort into getting the word out about the regulation," says Sundlof. FDA has sponsored workshops for state veterinarians and feed control officials from all 50 states, Puerto Rico, the U.S. Virgin Islands, and Canada. In addition, FDA has held briefing sessions with trade associations and consumer groups, and has developed additional guidances for complying with the regulation. FDA is continuing its compliance efforts by conducting additional inspections and re-inspecting non-compliant facilities. Based on an evaluation of the

inspections conducted from 1998 through 2000, FDA will revise its compliance strategy to try to assure its goal of 100 percent adherence to the feeding regulations.

FDA and USDA recently took emergency action to prevent potentially cross-contaminated products from entering the United States. On December 7, 2000, APHIS banned all imports of rendered animal proteins, regardless of species, from the more than 30 countries that either are known to have BSE in their cattle or otherwise present undue risk for introducing BSE into the United States. FDA has also announced an import alert, allowing its inspectors to detain shipments from these countries of animal feed (including pet food), animal feed ingredients, and certain other products of animal origin intended for animal use. FDA and USDA will continue to aggressively enforce their regulations and to work closely with those in the cattle and feed industries to minimize the risk of BSE introduction or spread in U.S. cattle herds. FDA will develop new guidances and regulations as the scientific knowledge about BSE expands. Working together with many counterpart agencies in the United States and around the world and with various industry and consumer groups, FDA will continue to do its best to protect the health of Americans and of our American cattle herds.